CABLE INSTALLATION TOOL

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Abstract

In the installation of a cabling system in a building to provide computer network, optical or electrical services, the bundled cables have to be organised into a neat assembly. The invention is a tool comprising a rigid plate a having a regular pattern of through holes d. In use, the cable e to be laid are threaded through the holes and the plate a then slid along the cable lengths allowing a neat bundle to be tied behind the plate as it is moved. The tool enables a cabling engineer to achieve a tidy result and in a shorter time that would otherwise be possible.

Description

CABLE INSTALLATION TOOL

This invention relates to a cable installation tool. The term cable is intended to cover computer network, optical cables or electrical conductors and the invention is concerned with means for organising a bundle of cables into a neat and tidy assembly. The bundled cable assemblies are used extensively in the network cabling systems which are installed in buildings and offices.

When network or optical cables are installed in a building, the task of fitting the cables into an organised bundle is known as cable'dressing'. The dressed bundle is termed a'loom'. A dressed loom of cables is typically a bundle of cables with the outermost cables, that is the visible cables, made to look neat and organised with the cable lengths all running parallel to one another. This is achieved by manually untangling the cables in the bundle and then manipulating the outermost cables to try to achieve straight parallel lines. The work is a skilled trade and generally it is only able to be undertaken by an experienced cabling engineer.

Even with the most experienced cabling engineer, the dressing task is laborious and time consuming with the end result being a neat loom of cables on the outside but always a disorganised array in the middle of the loom.

When manually dressing a loom of cables, it is not possible to maintain the position of all the cables in the loom continuously along the loom's entire length right up to the point of termination on a patch panel. The position of individual cables is not important until the dressed loom of cables is presented at the patch panel. It then becomes apparent that because the cables are not in any organised sequence the cables will appear randomly, totally in the wrong order, and this then leaves the engineer with the onerous task of making a tangled cable bundle look neat, organised and professionally installed. This problem further compounds the task of terminating the cables onto a patch panel where the cables ideally should be numerically in order, be sorted into odd and even numbers and more importantly, should appear from the loom in the right order and in the correct position.

Since cables from a loom dressed by hand do not appear in an organised sequential manner, this makes the operation to terminate the cables a needlessly untidy and awkward task. In addition, as the cables have to be individually manipulated to form a neat loom, problems can arise when tying the loom structure together, and without any means of keeping the cables in a particular order or position, the cables will naturally tend to mix-up and intertwine. The problem is further compounded when dressing cables from beneath a wiring cabinet, a wiring frame or from a ceiling void. This is because it is not possible to maintain the alignment of the loom's outermost cables such that they are prevented from crossing each other, subsequently all the cable lengths will fail to run parallel to one another. This makes the loom of dressed cables look untidy and unprofessionally installed with the cables crossing each other.

The aim of the cabling engineer is to achieve a dressed loom of cables where the individual cable lengths do not cross each other and always run parallel so that the dressed loom is free of any tangled cables. The individual cables can then be removed from the loom in their correct order and position and individually terminated. This manual method of dressing cables is very time consuming and it demands great skill. The loom of cables at the patch panel can still remain somewhat untidy depending on the level of skill shown by the engineer in dressing and terminating the cables.

The present invention was devised to facilitate the task of the cabling engineer to carry out

the dressing operation in a quick and precise manner. The invention can also be used to ensure that the cable lengths throughout the cross-section of the loom are supported parallel to one another.

According to the invention, there is provided a cable installation tool comprising a plate of rigid material having through openings surrounded by walls which are arranged to define a regular pattern of uniform diameter holes. The total number of holes may be from ten to a hundred. The hole diameter may be between 5 and 20 millimetres. Preferably, the hole diameter is 10 millimetres. The arrangement of holes on the tool may be organised such that the pattern of holes on one side of a diameter across the plate is a mirror image of the pattern on the opposite side. The holes may be numbered in sequence to assist loading of the plate with cables, the even numbers being located at one side of the diameter and the odd numbers at the other side.

Conveniently, the plate is provided with a smooth, outer periphery. In one embodiment, the plate is circular in shape. In another embodiment, the plate has a generally square shape with smoothly-rounded corners.

In a preferred embodiment, the plate is generally circular with part of the circle being cut away at a chord to form one flat edge.

The invention also comprises a method of organising an array of cables in a cable loom. It further comprises a method of dressing the loom by using a cable installation tool as just described.

By way of example, some particular embodiments of the invention will now be described with reference to the accompanying drawings, in which:
Figures 1 and 2 show a 24-way cable installation tool in respectively a plan and side view,
Figures 3,4,5,6 and 7 show different embodiments of the installation tool,
Figure 8 depicts a technique for loading the tool,
Figure 9 shows the tool supporting cable lengths parts of which have been secured together with cable ties, and,
Figures 10 to 14 show different situations arising when the installation tool is used to make a cable loom and to install the loom in a network cabling system of a building.

The cable installation tool of the invention, in its simplest form, is a disc containing a number of holes. The number of holes in the disc is significant as the device is designed to be used according to the recommendations of the Structured Cabling Industry. The Industry uses a variety of standardised patch panels being typically 16, 24,32,48 and 96 port patch panels.

The usage of these patch panels is accompanied by specified types of cable which are defined as Category 3,4,5,5 enhanced, Category 6 and Category 7 cable types. However, the tool of the invention is capable of being used on any type of cable which is able to be passed through the holes in the disc, including all types of coaxial and fibre optic cables.

As depicted in Figures 1 and 2, the cable installation tool a is a circular metal plate b made of brass with one part of the circle periphery being cut away at a chord to form a flat edge c.

The plate carries a regular pattern of uniform diameter holes d which are formed by a precision drilling operation. The corners of the holes d and of the plate are smooth so that no sharp surfaces will be present on the tool. Figures 1 and 2 show a 24-way installation tool with twentyfour holes d present whereas Figure 3 shows a 48-way tool. Each hole d is intended to act as a support for a cable length when this has been threaded through the tool, in addition it will keep that cable length spaced from a different cable length supported by another hole.

Figure 4 shows a different embodiment of a 16-way tool. In the Figure, it will be observed that each of the holes d has been marked with a numeral from one to sixteen. This marking of the hole positions may not actually be present alongside each hole d in the tool as it is intended to be supplied to the user. However, the marking is intended to indicate the order in which the individual cables in a bundle of up to sixteen cables should be inserted into the tool.

Thus, Cable No. 1 should be loaded into hole position No. 1, Cable No. 2 should be loaded into hole No. 2. This routine is continued until all sixteen cables have been loaded into the tool. It will be noted that the hole positions are arranged so that even-numbered cables will be loaded into holes on one side of an imaginary tool diameter line whilst odd-numbered cables will be loaded into holes on the opposite side of this line. This arrangement makes it easier for the cables to be withdrawn from the tool in the correct sequence when this is required later on in the installation process.

Since the tool a is intended to be used not only for dressing the cable but also for organising the cable lengths into their appropriate positions, it may be that a 16-way tool will be of too small a capacity to accommodate all the cable lengths that are required to be installed. In this case, one would take a first tool a which has been loaded with cables numbered from Cable
No. 1 to 16, and a second example of tool a would then be used to load cables numbered from
Cable No. 17 to 32. Therefore, Cable No. 17 would be put in hole position No. 1 of the second installation tool. The cables of higher numbers would then be put in their proper sequence in the remaining holes of the second installation tool.

Figures 5,6 and 7 show further embodiments respectively of 24-, 32-and 48-way tools. It will be noticed that the Figure 7 embodiment uses a slightly different arrangement of the hole d numbering system already described. The reason for this different numbering arrangement is because the 48-way patch panel is essentially made up in two halves. Ports 1 through to 24 take up the top half of the panel and Ports 25 through to 48 are situated on the lower half of the panel. The markings shown represent one straightforward way of loading and unloading the cables from the installation tool.

Figure 8 depicts a 48-way tool being loaded. The cables e are inserted from the underside of the tool a into their correctly numbered holes d. The individual cables are threaded through the holes d to the necessary length required in the correct numerical sequence. When all the cables have been threaded, the tool a is then pulled back up the lengths of cable towards the beginning of the loom. The tool will then hold the cable lengths in the most suitable spacing to one another and the first plastics cable tie may be fitted. The tool a may next be moved in stages along the length of the loom so that further ties may be added. The cables will then be removed from the holes in the required order ready to be terminated.

Figure 9 shows an installation tool a with cable ties f being used to secure the loom of cables together in their correct positions. The secured cable ties f stop the dressed cables e from tangling together and getting out of control. The cable looms have thus been put in a suitable condition to be installed.

Figure 10 illustrates the technique of using the cable installation tool a. The cables e not dressed in front of the tool may need to be shaken free to untangle any snagged or intertwined cables. To help maintain the shape of the loom, it is advisable to keep one cable tie f which is located immediately behind the tool in a loosely secured state since this prevents any cables from crossing each other prior to becoming firmly secured. The tool is continually pulled towards the end of the loom with cable ties f being used to secure the

dressed loom together and maintain its shape. The tool also assists in forming the completed loom around any awkward shapes and angles that may be present in the installation area.

The length of the cable to be pulled through any hole of the tool a is dependant on how far the cable loom is to be dressed. For example, in a wiring cabinet, the length of loom required might be from under the floor (or from a ceiling void) along a cable tray and up to a patch panel. Therefore, the length required might be 0.5 metres from floor or ceiling void, 2.0 metres up or down the cable tray and 1 metre to terminate on to the patch panels. The total of these figures gives an overall length of 3.5 metres which is required to be dressed. The cabling engineer will therefore pull about 3.5 metres of cable through the installation tool before using the tool to dress the cables.

Figure 11 shows a loom of cables being dressed onto a cable tray g and secured with cable ties f. For this task, the installation tool depicted in Figures 1 and 3 shows one flat edge. The flat edge of the tool should be positioned against the cable tray g surface and this measure helps to keep the cable loom from twisting out of alignment. This will ensure that the cables are in their correct positions when the tool has been moved along the cable bundle to reach the patch panel with the cables ready to be removed from the device ready to be terminated.

Figure 12 shows a close up view of the installation tool a when in use, it depicts a cable loom being made ready for attachment to a cable tray g alongside already dressed looms h.

Figure 13 shows the cable installation tool a being'unloaded'. Cables e are removed in the order in which they are required. If the installation tool a has been loaded with cables using one of the numbering systems already described, attention will have been paid to the relevant positions of all cables being in the correct holes. The cables then being removed from the tool will appear in the correct positions, in the correct order and being sorted into odd and even cable numbers. In this Figure, the flat edge c of the tool a is seen to be in an uppermost position since the dressed loom has been bent away from the surface of the wiring tray g to which the lower part of the loom has been attached. The orientation of the flat edge c is important when the tool a is presented at the patch panel ready for the cables to be removed from the device in the desired order.

Figure 14 shows an example of how more than one cable loom h can be dressed into a wiring cabinet. It depicts four individual cable looms which are tied to cable trays on both sides of the cabinet. The cable looms h have been fed out of a floor void i and bent round in a curved shape k before being attached to cable trays g. The installation tool a assists in helping the engineer maintain the correct bend radius for the curved shape k as specified by the cable manufacturer.

In use of the cable installation tool of the invention, it has been found to enable the work of the cabling engineer to be carried out efficiently and dressed cables of a high professional standard can be produced in a comparatively short time. The installation tool is capable of being used on cable bunches which are required to follow in any direction, such as vertically up or down, horizontally, diagonally etc. In the hands of a newly-trained cabling engineer, the installation tool can enable the level of workmanship achieved to match a high professional standard. Use of the tool has been found to give good control of the alignment of the cable lengths from the beginning to the end of the loom.

The foregoing description of embodiments of the invention has been given by way of example only and a number of modifications may be made without departing from the scope of the invention as defined in the appended claims. For instance, the installation tool does not have to be constructed of brass, it could be made of an alternative hard-wearing metal alloy or a suitable plastics composition. The hole size and hole arrangement could be

different from the examples given in the embodiments specifically described. The installation tool, of course, is not intended to be used on any live electrical cables at mains voltage.

Claims

CLAIMS 1 A cable installation tool comprising a plate of a rigid material having through openings surrounded by walls which are arranged to define a regular pattern of holes on the plate.

2 A tool as claimed in Claim 1, in which the total number of holes is between ten and a hundred.

3 A tool as claimed in Claim 1 or 2, in which the hole diameter lies in the range between 5 and 20 millimetres.

4 A tool as claimed in Claim 3, in which the hole diameter is ten millimetres.

5 A tool as claimed in any one of Claims 1 to 4, in which the pattern of holes is arranged symmnetrically about a centre line of the plate.

6 A tool as claimed in any one of Claims 1 to 5, in which each hole on the plate is associated with a numeral marking.

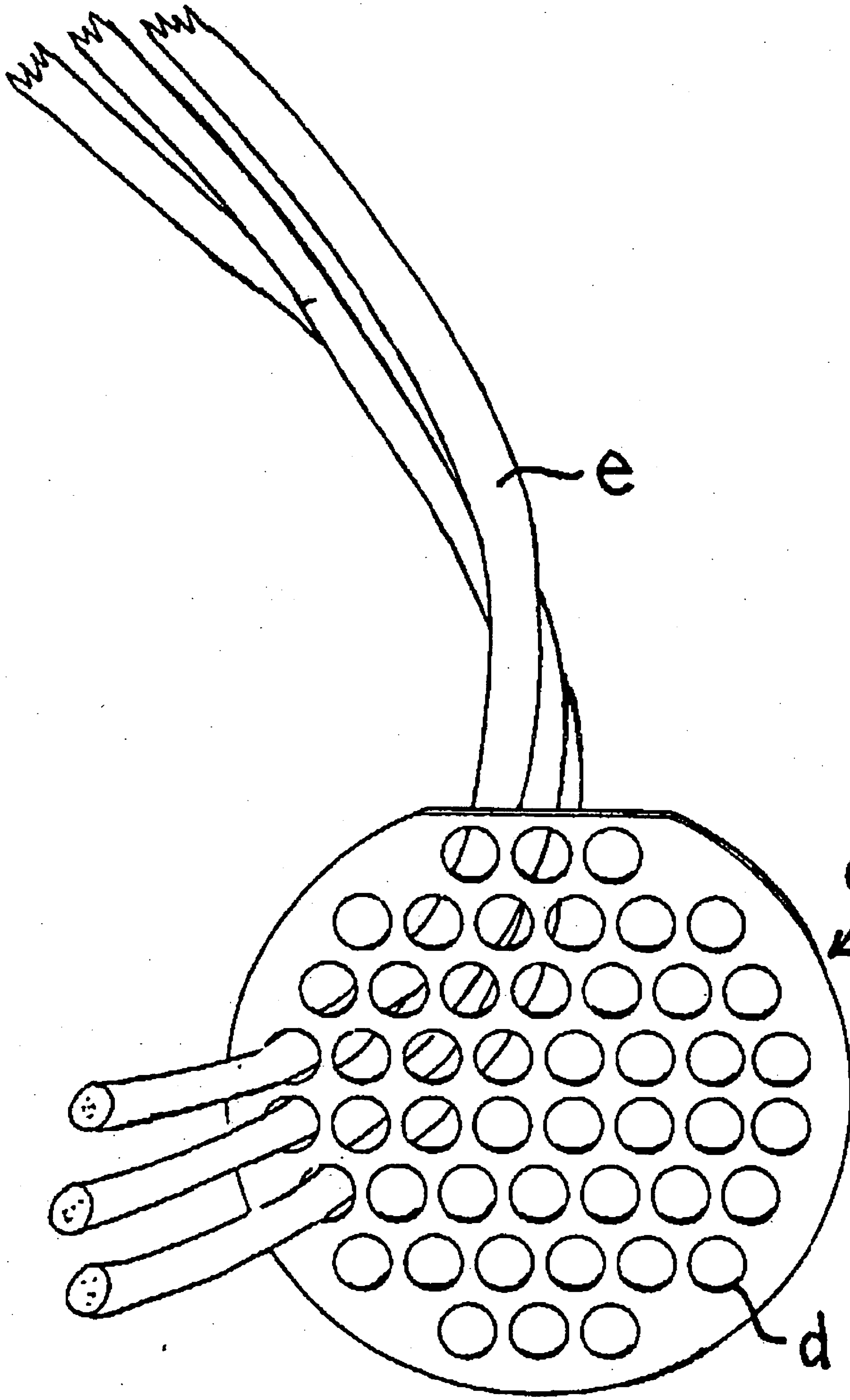
7 A tool as claimed in Claim 6, in which holes marked with odd numbers in a marking series are located on opposite sides of a plate centre line to holes marked with even numbers.

8 A tool as claimed in any one of Claims 1 to 7, in which the plate is circular in shape.

9 A tool as claimed in Claim 8, in which the circular shape is cut away at a chord to form a flat edge.

10 A tool as claimed in any one of Claims 1 to 7, in which the plate is generally square in shape.

11 A cable installation tool substantially as hereinbefore described with reference to any one of Figures 1 to 7 of the accompanying drawings.


e
a
d

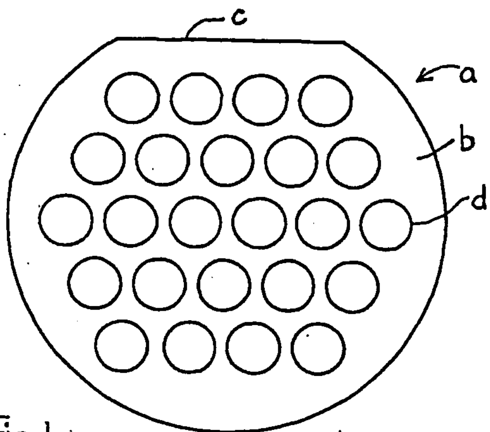


Fig.1

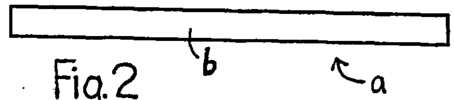


Fig.2

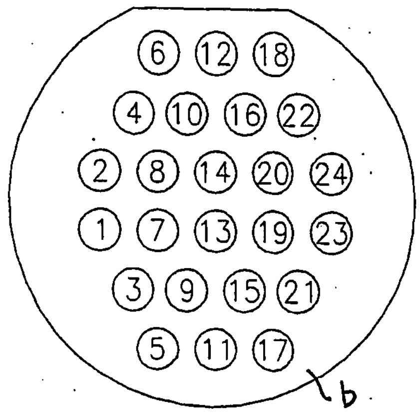


Fig. 5

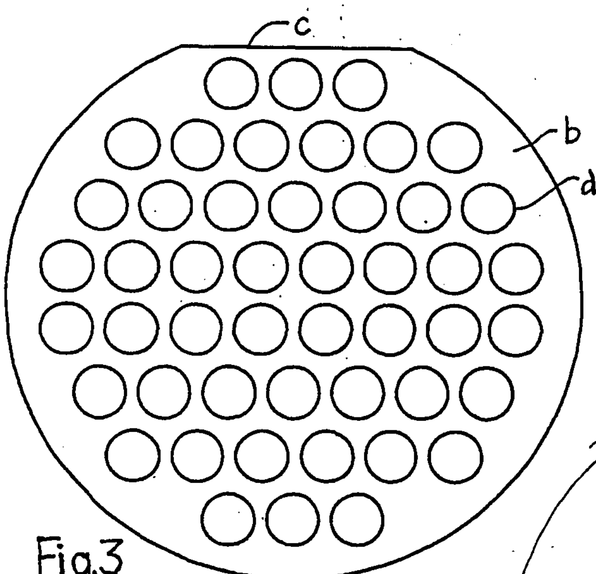


Fig.3

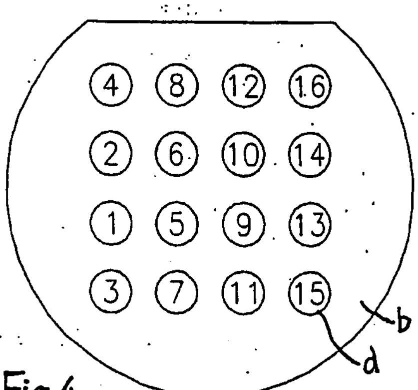


Fig.4

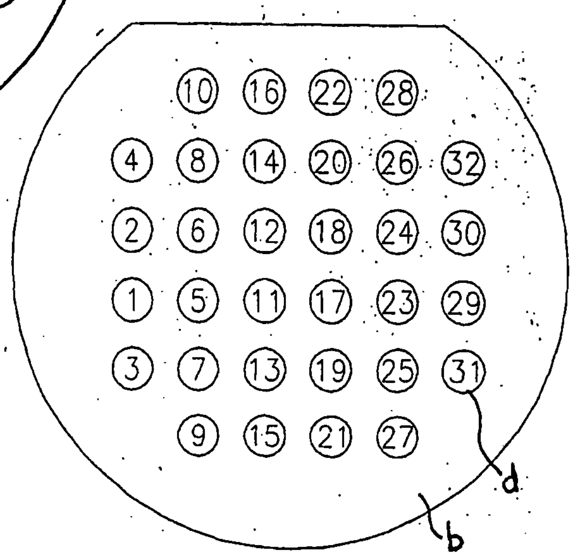


Fig. 6

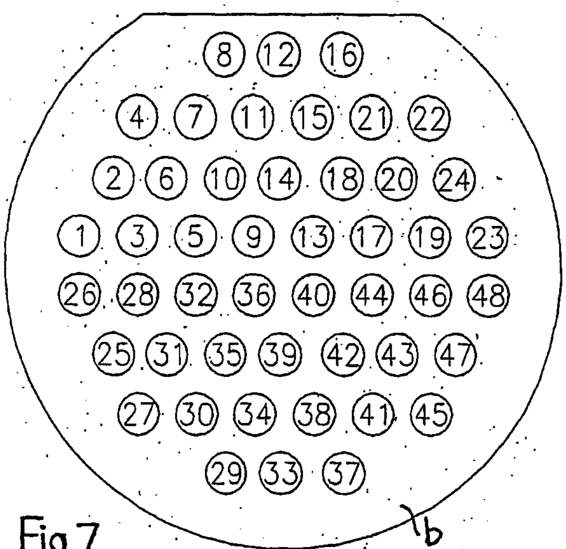


Fig. 7

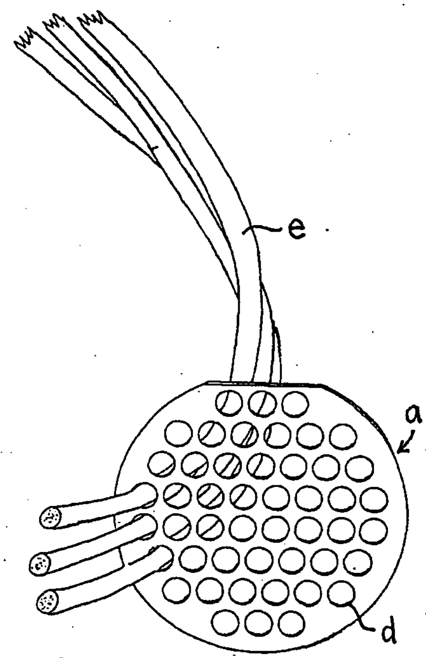


Fig. 8

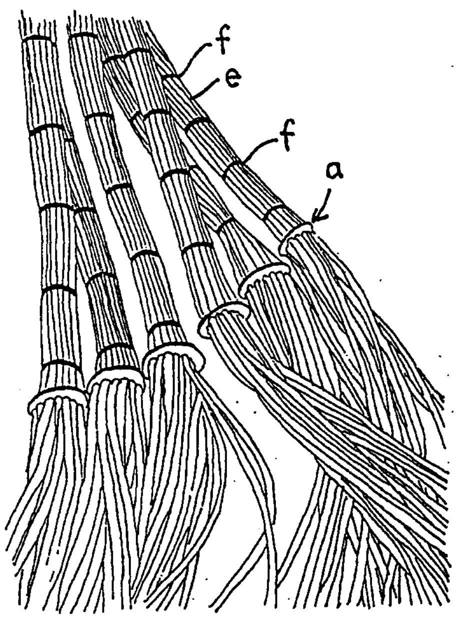


Fig. 9

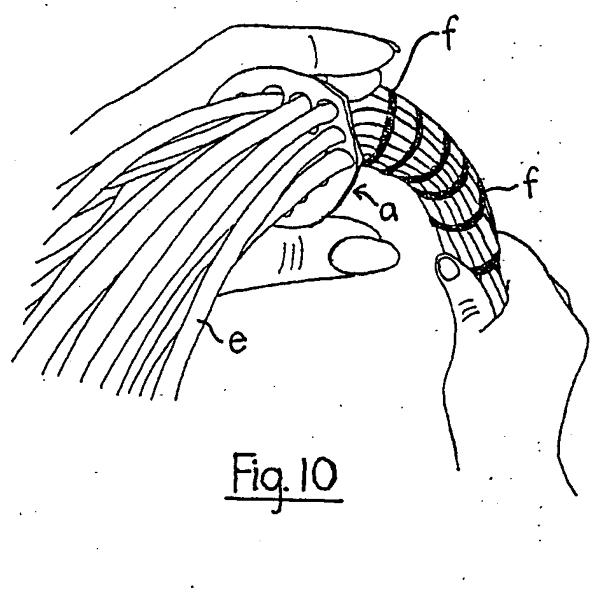


Fig. 10

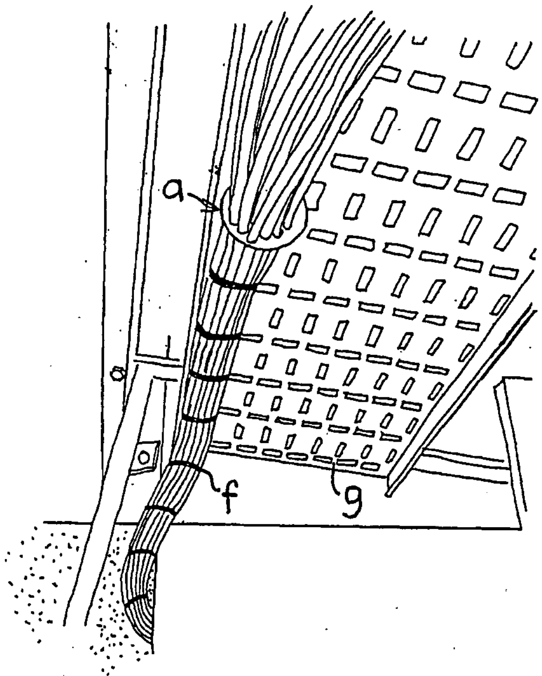


Fig.11

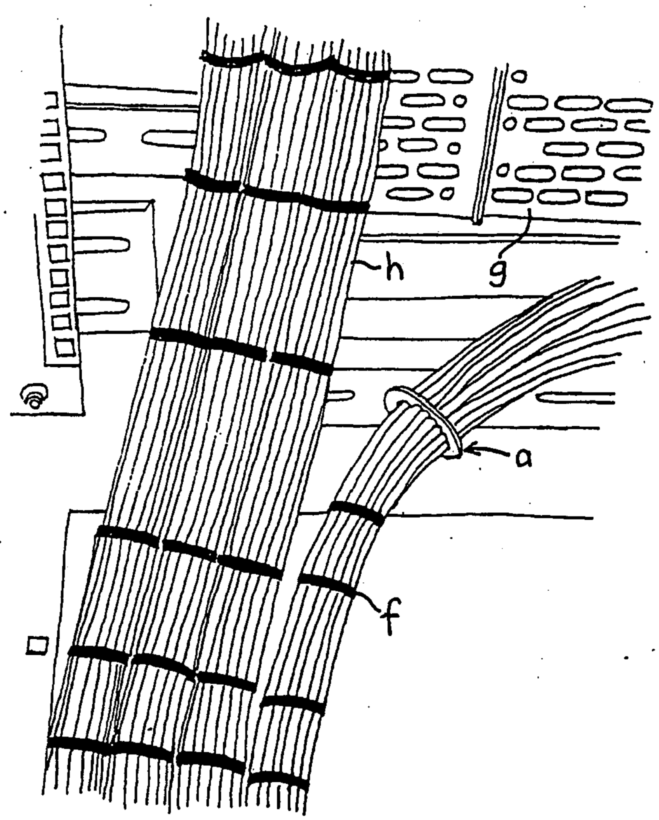


Fig.12

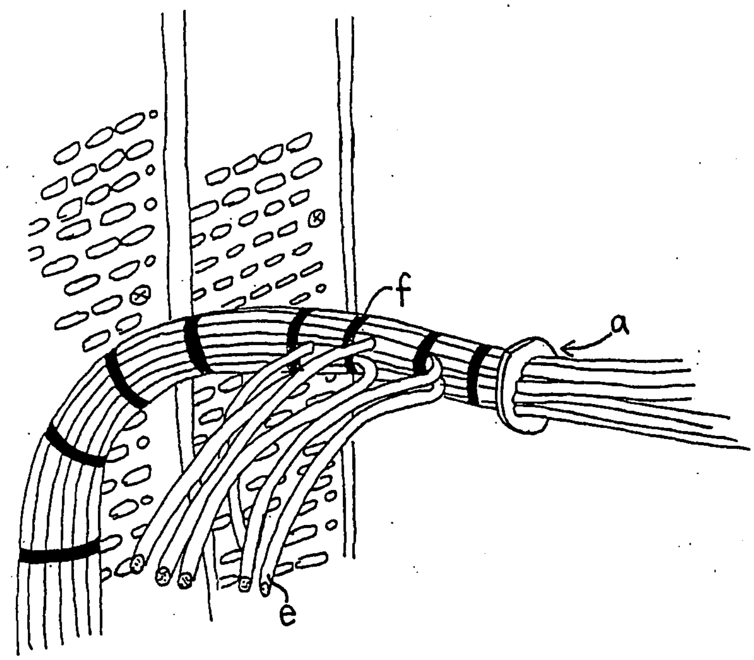


Fig. 13

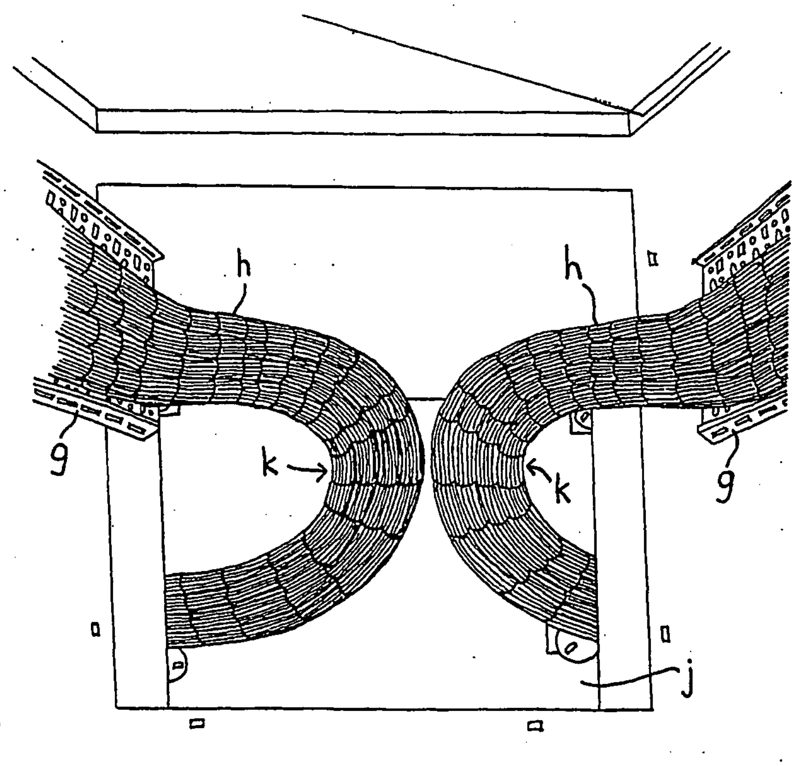


Fig. 14